Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

RECEIVED
AUG 1926
U. S. Department of Agriculture

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

COMBINED MONTHLY REPORT
BRANCH OF RESEARCH

FOREST EXPERIMENT STATIONS

DENDROLOGY

FOREST PRODUCTS

FOREST ECONOMICS

GRAZING RESEARCH

AUG 1926

GOVERNMENT PRINTING OFFICE 8—5156

COMBINED MONTHLY REPORT

BRANCH OF RESEARCH

August, 1926

	Page
Foreword	1-4
The World's Forestry Congress, S. T. Dana.	5-6
Dendrology	7-8
Forest Experiment Stations:	
Washington.	9-12
Northeastern.	13
Lake States	14-15
Appalachian	16-19
Southern.	20-21
California.	22
Pacific Northwest	23-24
Northern Rocky Mountain	25-27
Rocky Mountain.	28-29
Southwestern	30
Manuscripts	31
Forest Products	32
District 1	32
District 5	33-35
District 6	36-38
Forest Taxation Inquiry	39
Grazing Research:	
Washington	40-41
Jornada	42-43
Santa Rita	44-45
District 1	46-47
District 3	48-49
Research Editor	50-51

Reports Not Received:

Forest Products - Washington
Forest Economics
Grazing Research - Great Basin
District 6

COMBINED MONTHLY REPORT

BRANCH OF RESEARCH

August, 1926

Foreword

Introduction to Organic Research
E. E. Reid
(Continued from July report)

Qualities of Research

Newness. According to the accepted use of the word, research is the process of discovering something new. In science the line is drawn sharply and the object discovered must not have been known before. A mine may be found by a number of people but it belongs to the one who locates it first, so in chemistry. Ethyl benzoate has been prepared by hundreds of chemists but it was discovered by only one, the first one who made and described it. The proper description of it is as essential as the staking out and recording of the mining claim. A mining claim is invalidated if a prior discovery can be shown and it is considered one of the worst things that can happen to a chemist to find that his discoveries had been anticipated by others. One who publishes as new something which is already in the literature has made a scientific faux pas and incurs the ridicule of his colleagues.

While newness is an absolute quality in the sense that a thing is either new or not new, yet the newness may be limited in the extent of its application. A hatchet may have a new handle in which case the newness applies only to the handle and even then the new handle may have been fashioned from a piece of wood centuries old--the newness being restricted to its form and present relation to the hatchet. The nine hundred and thirtieth person who prepares ethyl benzoate may find out something new about it, may determine its boiling point, or some other property more accurately than had been done before, or may devise some easier or more economical way of making it, in either case adding to the sum of human knowledge and making a discovery.

When planning a research the first thing to be ascertained is just what has been done so as to make sure that what is to be undertaken is really new and a definite advance on what is already known. The density of ethyl alcohol has been determined with great accuracy and with most carefully prepared materials. It would not be worth while to redetermine the density of ethyl alcohol unless one had discovered some new means for purifying it or some more accurate method of finding the density.

Accuracy, reliability and truth. These qualities may be grouped together, as they are closely related; in fact one need not try to differentiate between them as no one of them is of any value without the other two.

Accuracy involves close observation and minute attention to all essential details. In the determination of physical constants, accuracy is required not only in making the observations themselves but also in the instruments and apparatus employed. One might determine the density of a liquid to the fifth decimal place but if the weights used are faulty, or the regulation of the thermostat unreliable, or the purity of the liquid questionable, the result would be worthless. In a building, strength must extend from the foundation up and the foundation must rest on bed rock: so accuracy must extend from the ground up. False ideas of accuracy are often conveyed by calculating to four or five places of decimals, results which are doubtful in the third or even in the second. It is much easier to read a thermometer to 0.01° than it is to be sure that it is correct to 0.1° and it is obviously silly to record the hundredths unless one is certain of the tenths.

The standard of accuracy should be determined by the circumstances and the class of the investigation. Good judgment and common sense must decide the degree of accuracy that is needed in each part of an experiment. The only excuse for doing an atomic weight determination is the possibility of excelling previous work in accuracy. In redetermining the physical constants of organic compounds the same statement holds. In determining the constants of a new compound the standards accepted by the best investigators in that field should be regarded. Thus densities should be determined to four decimals. It is usually sufficient to state melting and boiling points to the nearest degree.

Accuracy may be secured by practice in the manipulations and by testing all instruments employed. Before making a determination on a new compound, one should test out the apparatus and methods, and also one's skill on a compound of assured purity whose constants are accurately known. By calibrating one's instruments in this way, accurate results may be obtained with imperfect instruments. Thus a thermometer may read 98.4° when it should read 100°, yet accurate temperatures may be found with it by adding the proper corrections to the readings. It is a nuisance to have to use corrections all the time, but accuracy may be attained, provided the corrections are known and applied. One should repeat the determinations on known compounds till reproducibility is attained and the results agree with the best figures in the literature. Only then may results with new compounds be trusted.

It is common to speak of theories as evanescent and to regard facts as eternal, but how long the facts will endure depends on their accuracy, since future refinements in apparatus or methods may wipe out the facts as we now know them. A more accurate determination supersedes a less, just

as we throw away old shoes when we buy new ones. If we wish long life for our data we must take the utmost care that they are so accurate that it will be difficult to improve upon them.

Reliability may be regarded as an addition compound of accuracy and truth for if either of these is lacking the result is untrustworthy, but it goes somewhat further and includes some other qualities. Measurements may be accurately and conscientiously made, and yet lead to unreliable results if some source of error has been overlooked. An unsuspected impurity may be present and lead to erroneous results.

There are so many organic compounds to be made that we can seldom afford the time to prepare any one compound in more than one way, and for that reason many of the determinations of properties are in error. A compound nearly always retains more or less impurities derived from the materials from which it is produced, or from by-products in the reactions involved. If it is a solid and is recrystallized to constant melting point, we assume that it is pure but we may still have a mixture. If the same substance is prepared in an entirely different way from other materials and by different reactions, it will also carry impurities, but they will probably be different. Now if the two lots are purified separately till their properties are identical, we will be far more sure of them.

It is valuable to read atomic weight determinations to see how one source of error after another has been discovered and eliminated. A vast number of painstaking and accurate measurements were made of esterification velocities in absolute alcohol by men of unquestioned honesty before it was realized that a trace of water, even as little as several hundredths of one per cent, influences the results so profoundly that all measurements made with so-called "absolute" alcohol were worthless unless the utmost precautions had been taken to eliminate traces of water.

Reliability is impaired by omission as well as by commission. We must do our utmost to make sure that we have not been deceived or tricked by appearances.

A student found a considerable difference in the velocities of the same reaction between the same chemicals in two similar flasks, the one in an electric field and the other not. He was just about to make an important discovery on the effect of an electric field on the velocity of chemical reactions when he found that the metal in the coil was influencing the temperature of the reaction mixture and that this was responsible for the change in reaction velocity on which the current itself had no influence.

Reliability requires not only that experiments be accurately carried out and truthfully reported but that they be properly designed for the purpose in hand. All conclusions must be carefully tested and checked up.

The last of these three, and the greatest, is truth. In the World War camouflage, which has figured in every war since the beginning, even in fights between animals and insects, was developed to a science as well as an art; in horse trading it is not customary to be brutally frank in telling all of the horse's failings, but in science the most absolute and unsparing honesty is a prime requisite.

At first sight it would seem an easy matter to be truthful and frank about matters which do not involve money or personal advantage, but intellectual honesty and scientific fairness are difficult to attain. Sometimes the deviation from them is apparently unconscious and due to lack of ability to make the fine distinctions required. Material property is objective and one can usually ascertain when he has taken another's overcoat, but not so with ideas. It is easy for one to take part in a conversation and come away with the firm belief that one had been the first to suggest a certain idea and had a right to its exploitation. Two men frequently have the same idea in somewhat different forms or stages of development. It is frequently difficult to say whether the fundamental idea is the chief thing and the rest only a natural development or whether the special way of carrying out an obvious reaction is the discovery. We encounter in patents and also in pure science many difficult distinctions between "mine and thine."

In the presentation of one's work it is easy to depreciate the progress made by others on the problem before one took hold of it and it is as difficult for an enthusiastic investigator not to paint his own results in bright colors as it is for young parents not to feel the superiority of their first son over all previous accessions to the human race.

Of course the moral distinction between an enthusiastic over-statement and an intentional misrepresentation is obvious and important, but in science we must be on our guard against both.

(Concluded next month)

# # # # #

THE WORLD'S FORESTRY CONGRESS

Samuel T. Dana

The World's Forestry Congress, held at Rome from April 29 to May 5, 1926, under the auspices of the Italian Government and of the International Institute of Agriculture, brought together several hundred delegates from some fifty countries. It was thus the largest and most notable gathering of foresters ever held. Europe was naturally most heavily represented, with particularly large delegations from France, Spain, Italy, Poland, Czechoslovakia, and Jugo-Slavia, but the other continents contributed as many as could reasonably be expected in view of their distance.

The chief value of the Congress perhaps lay in -

(1) The opportunity which it afforded foresters to establish personal contacts with a large number of other members of their profession from all parts of the world.

(2) The tremendous amount of information concerning the organization and practice of forestry that it brought together in the form of written reports which will be published.

(3) The concrete recommendations which it made for the collection of international forest statistics.

From the standpoint of the individual members of the Congress, it is safe to say that the friendships formed will prove the most important and permanent result of their participation. This is not said with any desire to minimize the value of the formal meetings of the four sections into which the Congress was organized, or of the 250 odd reports prepared for it. Only a few of the latter could actually be presented, and the short time available, together with the difficulties of language, prevented any adequate discussion of them.

Of the many resolutions adopted by the Congress the most important is that dealing with the collection of international forest statistics. This resolution was the product of two days of thorough-going study by a subcommittee headed by Lord Lovat, Chairman of the British Forestry Commission, and including representatives from many of the more important timber-exporting and timber-importing countries. After pointing out that "the data required for the compilation of statistics must in every case be collected by the individual countries themselves," the resolution recommends the creation in the International Institute of Agriculture of a Bureau of Forestry Statistics "which would be the source of inspiration, would unify methods, and would collect, coordinate, and publish forestry statistics." Its other essential recommendations are that the director of this bureau be a forest economist of outstanding experience and ability who is generally recognized as an authority in this field; that the new bureau be given the maximum permissible degree of autonomy; that it be adequately financed, with

an annual budget of from $20,000 to $40,000, raised by special contributions from Governments, wood-using industries, associations, and individuals; and that the director of the bureau be selected from a list of nominees submitted by the Governments and organizations contributing to its support, with the advice of a committee of technical foresters. The announcement made at the Congress that such support has already been promised by the Italian Government gives substantial basis for the hope that the proposed bureau may soon be a reality.

Another resolution dealing with forest statistics adopted by the Congress was proposed by the delegation representing the World Agriculture Society. This delegation consisted of S. T. Dana, Chairman; Anders Fjelstad, Norway; A. Serpieri, Italy; and Vlad Brdlik, Czechoslovakia. The resolution called attention to the importance of forest products as a farm crop, and urged that data on the amount of wood cut on farms be included in the World Census of Agriculture to be taken in 1930.

In addition to the meetings in Rome, the members of the Congress were entertained at the International Sample Fair at Milan, and spent two days at the Institute Superiore Agrario e Forestale at Florence and at the famous Forest of Vallambrosa as guests of the Italian Forest Service. Immediately after the Congress there was also an excursion to the forest of Sele near Naples.

There is every reason to believe that the 1926 World Forestry Congress will go down in history as marking an important step in the development of closer and more helpful relations among foresters throughout the world. Arrangements for the next Congress, which it was felt should be held in 1930 or 1931, were left in the hands of the Permanent Committee of the International Institute of Agriculture.

# # # # #

DENDROLOGY

Handbook of the Boy Scouts of America

The present edition of the Boy Scouts Handbook was revised and largely rewritten in 1916 and many thousands of copies have been distributed to members of the Organization during the last ten years. The writer contributed an illustrated article for this edition dealing with some 80 Native Forest Trees, such as would be of interest to Boy Scouts in different regions of the United States. The article printed in the previous edition, contributed by Ernest Thompson-Seton, comprised only fourteen or fifteen New England trees, which afforded no information for Boy Scouts outside of northeastern United States.

The enormous growth and extension of the scout organization makes it necessary now to revise and extend the scope of the present Handbook so as to include many new subjects and improved means of presenting old subjects which experience has shown can be presented more simply and effectively. The Executive Staff of the National Council has called upon all of the contributors to the Handbook to review and improve their old articles in the interest of present needs. Accordingly, the writer has considerably enlarged the original chapter on Native Forest Trees by adding to it a tabulation of the trees to be found in each of the four geographic regions of the United States. Scouts living in one of these regions can now quickly find out what trees of interest are to be looked for in their section of the country.

Important Western Browse Plants

Mr. William A. Dayton is the author of this forthcoming treatise, which the writer was asked to review. It is a very large contribution to grazing literature, comprising some 450 typewritten pages, with many very excellent illustrations which Mrs. Annie E. Hoyle has executed with her usual consummate skill. The author has brought together under the different plants an enormous amount of valuable information which indicates a very exhaustive investigation of the subject. It is hoped that the bulletin can be published practically in its present form, which will be of great interest and value to the grazing interests of the West. Important features of the work are the attention given to the relative palatability of the different browse plants, and also to the poisonous plants that are dangerous to grazing stock.

The Killing of Washington City Trees

The extensive repaving of streets in Washington has resulted in killing and seriously damaging a great many street trees. Reside ts near these operations have vigorously protested to the City Commissioners against this apparently unnecessary destruction of trees. The Engineer Commissioner, Col. Bell, asked the Office of Dendrology for a report on the nature and extent of damage being done to the trees.

In order greatly to hasten, and, therefore, to reduce the cost of removing old asphalt pavement, the contractors putting down the new pavement employed a machine which applies 1,000 degrees of heat (Fahr.) to the pavement, so that the latter is quickly softened and can be easily removed. The heat is so intense beneath the overhanging street trees that all of the foliage is killed. With it also the winter buds are killed, and the cambial layer of the twigs for a length of two or three feet. This means destroying this year's foliage and the present beauty of the trees, and through the death of the winter buds prevents the putting forth of foliage in the spring of 1927, while the killing of considerable lengths of the twigs will necessitate extensive pruning of these trees in order to rejuvenate such of them as do not succumb. It is very questionable if the city authorities are justified for the sake of saving time and money in putting down new pavement in paying so heavily in terms of death and damage to the city's trees. Certainly no private citizen would permit a like damage to be done to his trees in order to facilitate improvements or repairs of any kind.

# # # # #

WASHINGTON

General

Messrs. Clapp and Marsh are still in the field somewhere in the wide open spaces of the West. According to the latest information they plan to return to Washington some time about the first of October. Bruce has temporarily left the Service again, but will return later on in the winter. Reineke returned from a six weeks' trip to the Northern Rocky Mountain Station, where he assisted in the white pine yield study. Dr. Korstian came to Washington following the International Plant Science Congress at Ithaca for a detail in the Experiment Station Office while Munns is away from Washington. During August, Munns visited the Appalachian Station attending the Advisory Council meeting and later making a field trip into Kentucky.

New Stations

Word has been received that the Bureau of the Budget has approved an item in the next year's appropriation estimates for two new forest experiment stations; one in the middle Atlantic States and one in the Ohio-Mississippi Valley. While the approval of the Budget will go a long way towards getting funds for these stations, there is still a possibility that the establishment of the station will be further delayed. Inasmuch as we cannot make public any notice of the action of the Budget Bureau upon estimates, this matter should be kept within the organization.

California Station

E. I. Kotok has recently been appointed as the director of the newly created California Forest Experiment Station. Kotok is known throughout the Service and the Forest Experiment Station organization for his work in fire protection and as coauthor with Show of several publications on fire. Kotok is a graduate of the University of Michigan forest school, and was assigned to California upon passing the forest assistant examination in 1911. His early work was on the Shasta National Forest, from which he graduated when he became Supervisor on the Eldorado National Forest. Later he was assigned to the District office in charge of fire protection and cooperation with the State under the Weeks Law and Clarke-McNary Act. Kotok is thoroughly familiar with California and local conditions, and is widely known in the State as well as elsewhere.

The members of the Station staff at the present time include in addition to Kotok: Duncan Dunning, for many years associated with Show in research in the district office, A. E. Wieslander, formerly in charge of timber sales on the Lassen National Forest, and H. W. Siggins, a junior forester from the 1926 class. With the exception of Kotok, all are local California men. Miss D. H. Vinther, in charge of the clerical work, has been in the district office research organization since 1919.

The location of the Station has not yet been decided, but it is expected that it will be settled soon after the Secretary returns to Washington this fall.

American Scandinavian Cooperation

Recently there has been some correspondence between the Forester's office and the Scandinavian Foundation as to the possibility of employing in the Forest Service some graduate foresters. In addition to the proposal to employ a few of these men in administrative work, it has also been proposed that one or more men be selected for work at the experiment stations. From a list of graduate Swedish, Norwegian, and Danish foresters one or more men would be selected who had the required or desired traits necessary for forest research. This man would then be employed on a temporary basis as a field or office assistant at one or more stations where his services would best be used, the Foundation making the trip to America possible. Our first choice would be, of course, American foresters who might be interested in research and to whom the placeswould be in the nature of training positions, and the possibility of employing the foreign foresters depends upon conditions.

Foreign Purchases

Some question has arisen of late as to whether the Government is exempt from paying duty on instruments purchased in foreign countries. The old tariff act contained a clause specifically exempting Governmental institutions from paying duty upon scientific instruments. Unfortunately the new tariff act omitted this clause and it is now necessary for us to pay duty on all imported scientific equipment. This duty amounts to about 40 per cent of the value of the instruments.

Recently arrangements were made for purchasing a new dendrometer developed by C. J. Liljenstrom, a "Forest Master" of Stockholm, Sweden. Dr. Tor Jonson exhibited this instrument at the International meeting at Ithaca. This instrument is being purchased for use at all forest experiment stations and at the present time is in the custody of the Northeastern Station. Applications for borrowing it should be sent to Washington to avoid conflicts and that we may arrange for routing should more than one station desire to try it out.

International Congress of Plant Sciences

The forestry section of the International meeting at Ithaca was very much of a disappointment in that there were so few representatives from foreign countries present and so little interest even among American foresters. Sweden, Germany, Switzerland, and Canada were represented. From the experiment stations Dana, Zon, Forbes, Korstian, and Munns were present. Miss Gerry represented the Laboratory. Comparatively few of the forest schools were represented, and only one State.

International Congress of Soil Science

Of international meetings there seems to be no end and just how far the "new internationalism" will affect forest work remains to be seen. Dr. J. G. Lipman of Rutgers College has asked for suggestions as to topics in which foresters might be interested at the Soils meeting to be held next June in Washington. It has been suggested to Dr. Lipman that at least one half day session be held in which forestry will be stressed, making a symposium on some such a topic as soil nitrification, changes in physical and chemical composition of soil due to drainage, and soil in its relation to establishment of natural reproduction. It has also been suggested that Dr. Hesselman of Sweden be made Chairman of this meeting. We would like suggestions as to topics suitable for discussion at this meeting and papers that might be prepared for it.

Accuracy in Manuscripts

A check of manuscripts having passed through our hands in the past year indicates that nearly 15 per cent of the time of those in the Section of Forest Measurements is devoted to checking manuscripts. In the past 12 months the number of errors found has been astounding, exceeding in one case 200, and in another almost as many. Certainly the number is too large, and, as the stations become better organized and equipped ~~they~~ should show a reduction. Most of these errors it is only fair to say were slight such as those caused by improper raising and lowering figures and not as serious as are specific mistakes in calculations. Many of these errors, however, are unnecessary if sufficient care is taken to follow instructions. The most common types of errors in the order of their importance are raising or lowering figures, mistakes in additions and subtractions, calculation of percentages, using slide rule in preference to comptometers or logarithms for precise calculations, and carrying figures beyond the extremes of the data and ~~to~~ limits of error. As an example of the latter which is all too frequently found, a recent manuscript gives diameter measurements to the fourth decimal place! Inasmuch as some of the original measurements were made with calipers the accuracy connoted by the use of four places is at least open to considerable question. A careful examination of the observation errors in any problem ought to yield a fair estimate of the precision, and the more imposing the array of significant figures, the greater the obligations of the author to defend his results.

Publication Troubles

Many who have seen recent publications have had some criticism of the quality of the paper used and each budding author hopes that his manuscript will appear eventually in printed form much more attractive both in cover and style than those papers that have preceded his. Unfortunately the Service has to deal with several different agencies before the manuscript is printed and in spite of considerable care on our part, changes are made without consulting the Service. The result is that often we get

only what the other man is willing to let us have, and not what we want. An effort is made in each case to obtain high grade paper which will be attractive and clear both in type and in figures.

Personnel

As the close of the summer season approaches, the attention of the stations with a summer field season is called to the fact that they should call the attention of the stations with a winter field season (Southern, Appalachian, and California) to those temporary men who might be used to advantage. Particularly should this be done in the case of students who have a future in research, who plan on staying out of school for a year, and who need additional experience that comes from work in more than one region. In the interest of the larger program of station development, it is only fair to the work generally as well as to the other stations and the men, to arrange for their transfer and their continuation in research as far in advance as possible. Local desires to retain a man at the possible expense of his getting continuous employment or of delaying urgent work at another station should be considered in the light of our Service-wide need for well-trained men and the larger development of the forest experiment station program.

There is also a need for frankness on the part of experiment stations as to the capabilities of the temporary men. At times stations have not been as full in their statements as they might be in describing a man's ability, weaknesses, or physical condition. It is expected that the stations will give complete information in this respect in order that we can weed out misfits and incompetents early in the game and really utilize the field assistant places to the utmost as training positions for desirable men. In this connection the opportunity for putting on record the possibilities of the temporary men employed at the station should not be overlooked, and Washington should be informed regularly and systematically as to the capabilities of the various field assistants.

# # # # #

A new disease of Scotch pine in New York is causing considerable concern to the pathologists. Much time has been spent by Spaulding in an effort to determine exactly what the parasite is and its probable life history so that an intelligent estimate may be made of its seriousness in the future. Spaulding spent the latter part of July and the first half of August in studies of the rotting of slash of both soft and hard woods in the White Mountains and the Adirondacks in company with Westveld. It is felt that a good start on this problem has been made, although there are local variations which require more time and more extended study for explanation.

Two sets of sample plots established by the Forest Service in 1906 at Corbin Park, New Hampshire,and West Rochester, Vermont, which were inspected by Behre gave some interesting results as to the damage caused by the bronze birch borer. Both sets of plots were in even-aged second growth hardwoods about forty and twenty years old respectively, which were thinned twenty years ago so as to favor yellow birch. Since then there has been a heavy mortality in the yellow birch, and many of the still-surviving trees are stag-headed, apparently as a result of attacks by the bronze birch borer. Whether this insect is a primary or secondary enemy, and the exact conditions which favor attacks by it, are questions urgently in need of study. It is hoped that this project, which is included in the Station's program for the present year and on which it has so far been impossible to do much, can be undertaken actively another season by representatives of the Bureau of Entomology. Dr. Craighead, who visited the Corbin Park plots, is much impressed with the seriousness of the problem.

Dana returned from Europe on August 17 and went straight to the International Congress of Plant Sciences at Ithaca. The meetings of the Forestry Section of this Congress were attended by about forty foresters but with a disappointingly small proportion of men from Europe. Professor Tor Jonson of the Swedish Forest School acted as chairman and Dr. Howe of the University of Toronto as vice-chairman. Many interesting papers were presented, and the preparation of an international forest bibliography and the reorganization of the International Union of Forest Experiment Stations were considered at round table discussions. The next meeting of the Congress will be in England, probably 1930, but it is not yet known whether there will be a separate section for forestry as was the case this year.

Visitors at the Experiment Station during the month included Professor Tor Jonson of the Swedish Forest School, Mr. Folke Johanssen, a graduate of the same school who is accompanying Professor Jonson, Dr. Heinrich Prell, forest zoologist and entomologist at the Forest Academy at Tharandt, Dr. F. C. Craighead, Dr. Haven Metcalf, Mr. P. G. Redington, and Professor R. S. Hosmer.

# # # # #

The first of the month the entire staff, with the exception of Mitchell, was at the new Upper Peninsula Station where a general conference was held in regard to the "Proposed Methods of Cutting in Northern Hardwoods" study, and the future development of the Station area. Mr. Zon remained at the Station for a week during which time tentative plans were made for the cutting that is to be done this fall. The method of marking was also discussed and a sample marking made.

During the week of August 15, Zon was in Ithaca attending the International Congress of Plant Sciences, at which he delivered a paper, "The role of the forests in the circulation of water on the earth's surface."

During the month, Brown, with the help of Verrall, practically completed the cruise of the standing timber on the U. P. Station area, while Kittredge spent most of his time with the group from the Michigan State College in Lower Michigan on the study of scrub oak type. Large and important areas of this type are found in Manistee, Lake, and Newaygo counties; even some where cuttings have already been made. Interlochen State Park, a tract of virgin timber, near Travers City, provided a picture of conditions under which the oak was present in the old-growth pine stands in the days before logging began. Toward Muskegon, interesting areas with white pine as an understory in the oak stands were found. Fifty temporary plots and 70 complete tree analyses have been made to date.

Development work at the U. P. Station has been progressing satisfactorily in spite of considerable rainy weather. The new laboratory and office building will be up, if not completed, in time for the Forester's visit. Both tracts of land have been subdivided into plots and markers have been placed so that these may be readily located. A number of signs have also been painted and placed explaining the nature of the projects under way. Work on the Mc study has progressed to a point where actual marking of the tract to be cut this fall will be started shortly. It is planned to have Colonel Greeley mark the first tree as a part of the dedication and formal opening of the Station which is planned for September 8.

Work on the swamp forest study in cooperation with the Michigan State College is also under way, the area to be drained having been surveyed and ditching started.

J. R. Lloyd of the Weather Bureau, who is to have charge of the fire weather forecasting in the Lake States, arrived in Minnesota the early part of the month. On the 13th he left with Mitchell for a week's trip through northern Minnesota. During this trip both the headquarters of the Minnesota and Superior National Forests were visited, as well as most of the State rangers' district headquarters, and cooperative observers who have been taking readings for the Station during the past two years. Plans are now on foot to establish about 8 observing stations throughout northern Minnesota from which daily reports will be telegraphed or telephoned to Duluth for use in connection with local fire weather forecasts. The latter,

in turn, will be telegraphed to key points throughout the State in order that State and Federal officers may receive them promptly. The organization of the fire weather forecasting work in the Lake States differs from that in the west in that cooperation must largely be secured from State and private agencies, since the Forest Service is only a small factor in the situation. Considerable interest, however, has been shown already by both State and private agencies in Minnesota, and with the pioneer work that has already been done by the Station, it is believed that rapid progress can and will be made.

Preparations for the Forester's visit and arrangements for the annual meeting of the Advisory Committee have taken considerable time. Indications are, however, that meetings planned for Upper Michigan will be well attended and serve a useful purpose in arousing the interest of that section in the work of the Station.

# # # # #

APPALACHIAN FOREST EXPERIMENT STATION

The Appalachian Forest Research Council meeting at Asheville August 6 and 7 was attended by 14 members of the Council and 23 guests. The sessions were held at the Battery Park Hotel and the Bent Creek field laboratory. The meeting was noteworthy on account of the presence of the State foresters of Maryland, Virginia, North Carolina, Kentucky, Tennessee, and Mississippi, all of whom contributed to the program. In addition to the trip to the laboratory an excursion was made to Mt. Mitchell, providing an opportunity to see the Experiment Station's plantations and those of the Pisgah National Forest and the State of North Carolina, and to visit the stone fire tower under construction by the State at the top of the mountain. Members of the Forest Service who attended the sessions were District Forester Kelley, E. N. Munns, Mrs. L. Conway, Supervisor Mattoon, Aldo Leopold, J. D. Rue, and several members of the Station staff. G. F. Gravatt and R. M. Nelson of the office of forest pathology, R. A. St. George of the division of forest insects, and Prof. L. J. Young, a member of the Lake States Advisory Council, were also present.

At the close of the Council meeting Munns and Frothingham left for Berea, Ky., where Haasis and his party were working on the methods of cutting plots. In company with President Hutchins and other members of the College staff, Munns and Frothingham went over most of the Berea College forest and visited the Station's sample plots and some of the plantations.

Another room was leased in the New Medical Building, adjacent to the five already occupied by the Station. The added space made it possible to order the furniture needed for the new members of the staff. C. F. Korstian has been assigned to Washington for two months during Munns' absence. The Station had the pleasure of a visit from Miss Vera Spuhler, clerk at the Southern Station.

Chestnut Sales in the Bent Creek Area

Two sales of chestnut are under way in the Bent Creek division of the Pisgah National Forest, including the Station's investigative area. All the poles had been sold but not removed prior to the decision to use 1,000 acres in the lower part of the valley for experimental and demonstration purposes. A sale of acid wood down to 7 inches, d.b.h., was made subsequently. The chestnut on this area is infected with the blight, and since these sales offered an early means of salvaging it, the sales were approved as a very desirable and necessary improvement cutting.

These cuttings will be valuable as demonstrations of the behavior of the forest after the removal of chestnut and as a means of checking the results of the Service policy of stimulating the exploitation of chestnut. Accordingly L. J. Young's party, consisting of Young, Buell, and Sims, was instructed to go through the investigative area and tag the stumps of all merchantable chestnut trees. Diameters breasthigh, crown classes, and

crown widths were noted, and the total heights of the trees were estimated. This will contribute to the history of the sample plots which will later be established. At the same time, two or three areas were marked out on which no chestnut will be cut. Plots will later be laid out in these to observe the changes due to the natural death of the chestnut.

Improvement at Bent Creek

The approach road to the laboratory, which was in bad shape, was improved early in August, and a new road, completing the circuit to the main Forest Service road, was built. Excavations were made for a concrete reservoir on the slope above the buildings, designed to supply water for fire protection for the grounds and later for nursery purposes.

Reproduction Following Controlled Cutting - Hardwoods (Hc2)

At Berea, Ky., Haasis, Kellogg and Davis reexamined tagged trees on the 35 quadrats (5.28 by 33 ft.) on sample plots 1 and 3. These quadrats were established on Berea College land in 1924 just after cutting and all the trees 1 foot high and up were tagged. A great many of these trees have died. In one case an elm stump which in 1924 had 178 sprouts now has only 14. On the other hand, there were a good many new trees to be tagged, on one plot about as many new ones as in 1924, on the other plot four times as many. Some of the quadrats had 10, 20 and 30 times as many new trees as were tagged two years ago.

On these two plots, not only was the tree reproduction abundant this year, but the weed growth, too, was very luxuriant. On plot 1 this was especially true, jewelweed and pokeweed 4, 5 and 6 feet high being very abundant.

Some of the larger trees which were left at the time of cutting had grown considerably and it was necessary to replace the tags.

At Munns' suggestion a crown projection map was made of part of Plot 3, using plane table, open-sight alidade or F. S. compass, and steel tape. Probably stadia work would be better for the reproduction. It was found that now, two years after cutting, there is very little of the ground which is not covered by the crowns of the trees at least an inch in diameter at breast height. In many cases there are two or even three layers of crowns. It was interesting to note the effect of these layers at the beginning of a rather heavy shower in which the rain was falling straight down. In the openings there was considerable rain, but under the triple canopy hardly any was reaching the ground. This evidently has considerable significance in controlling the conditions on the forest floor. It will result in less rain reaching the ground than in the openings and falling less hard, but, on the other hand, the shade will reduce the evaporation from the forest floor.

Fire Damage (Pf, A-1)

McCarthy's party of three men, Hough, Garstka, and Bull, moved on the first of the month from a study of fire damage on the Boone division of the Pisgah National Forest to a burned area near Konnarock, Va. Here a variety of conditions following the cutting in white pine, hemlock and hardwood forest were studied to find the effect of heavy fire on regeneration. An area was examined which burned very severely in June 1925, another which burned in May 1926, and also areas which were not burned since the cutting. Records on land clear-cut for white pine, hemlock and hardwood showed considerable regeneration from seed stored in the soil, notably locust, poplar, and sassafras, as well as seedlings of grape, dogwood, pokeweed, sumach, and blackberry. Comparison with similar, but unburned and slash-covered, areas indicated that considerable reproduction of other valuable species probably had been present as advance growth, but had been destroyed by the fire. White pine and hemlock were the most important of these.

Growth and Yield of Oak (TS-12)

Early in the month McCarthy's party moved to other points in Virginia where clear cutting for charcoal production had created second-growth stands of oaks. A number of plots were added to those already acquired in the oak yield study. Plots were measured near Warm Springs, Va., near Shenandoah, Va., and at Van Buren Furnace, Va., on Cedar Creek. During the last two days of the month the party was divided to get measurements on cut second-growth oak near Wardensville, West Va. Here three sawmills were found operating in second-growth oak, one stand being 155 years old.

Permanent Plots in Young Stands (Me-1)

The first two plots in this new project were established on Star Gap Branch, Curtis Creek, Pisgah National Forest, in July, but were not mentioned in the July report. These plots were put in by Young's party and Frothingham, in cooperation with Supervisor Mattoon and Junior Forester Beichler, of the Pisgah staff. They cover eight-tenths of an acre, with eight subplots of four square rods each, on which all trees down to 1/2 inch, d.b.h., were tallied and the heights of average dominants measured. The oldest trees in the stand are six years old, but the stocking is irregular.

In August, Haasis' party laid out two plots of one-half acre each in the scattered forest growth on an old field in the Berea College tract. The field was abandoned 6 or 7 years ago. Tallies were made of eight subplots of four square rods each.

Forest Plantations (Fp-2)

A sample plot was laid out by Haasis' party in a 15-year-old plantation of Virginia pine in the Berea College tract. Over 400 trees were tagged and measured. The purpose of the plot is to get growth figures for Virginia pine, native stands of which are quite common in the region.

Thinnings in Hardwoods (Mt-2)

Three permanent sample plots were laid out by Young's party in second-growth hardwoods, largely yellow poplar, at the foot of Kagle Mountain, near Bent Creek. The thinning of these plots will be deferred until fall or winter.

of
Chestnut Blight Studies by the Office/Forest Pathology

R. M. Nelson, L. S. Gill, R. M. Lindgren, and E. J. Eliason, of the office of Forest Pathology, are investigating several phases of the chestnut blight problem in the Southern Appalachian States. Surveys are being made of regions still free from blight and in regions which are only partially infected to determine the rapidity with which the disease is spreading. The party spent most of the latter half of August in western North Carolina.

Since the merchantable stands of chestnut are doomed, the salvaging of such blight-killed timber is a problem of paramount importance. With the view of determining the probable rate and degree of deterioration of chestnut wood, a number of stands which have been girded or fire killed for 5 to 30 years are being studied. Sections from representative trees on each area will be analyzed for tannin content. With such information at hand the timber owner will be able to anticipate the future condition of his chestnut stands.

# # # # #

SOUTHERN FOREST EXPERIMENT STATION

General

The New Orleans office was practically deserted this month with men out on various field trips and Forbes on his vacation during the last half of the month. Miss Spuhler and Miss Regan took their vacations at this same time.

The long-hoped-for office move was made this month, the new location being only three doors away from the old one, but giving us more than twice as much space as before.

Among several visitors during the month were Mr. Powell, Development Agent of the Louisiana Southern Railway, who wanted information on the stand of veneer species in the South; Mr. C. P. Sweetser of the Argus Products Co., Portland, Oregon, who is looking into the supply of sawdust, slabs, and waste in the Southern pine region; and Mr. F. V. Dunham, at present conducting a survey of the longleaf pine stump lands of the South for the Hercules Powder Co., who desired to obtain a map showing the boundaries of the longleaf pine type. This request points to the need of a forest type map of the South, something which Demmon has been working on at odd times.

W. W. Ashe spent several days in New Orleans and was later accompanied on a trip through northwest Louisiana by Wakeley, looking over several prospective tracts for the location of a National Forest purchase area.

Among the visitors at the Starke branch station were Mr. O.H.L. Wernicke, Chairman of the Pine Institute of America; Mr. H. L. Baker, Forest Inspector from the Washington office; and Mr. E. W. Hadley, Assistant State Forester of Georgia, all of whom desired first-hand information on the naval stores investigations under way at Starke.

Demmon, Wakeley, and Barrett spent a very interesting day at Woodworth, La., visiting the State Forest Nursery. Here the recent addition of a "Skinner" overhead sprinkling system, at a cost of $1165, has made it possible to supply water, similar in its effects to a fine rainfall, to a four-acre nursery site. This sprinkling system can produce the equivalent of one inch of rainfall in nine hours steady running.

Demmon visited a hardwood tract near Opelousas, La., with Mr. W.R. Hine, State Forester, and Mr. John R. Thistlethwaite, owner. This area was cut over lightly several years ago with the idea of leaving it in the best condition for timber production and is now fully stocked to a mixture of valuable hardwood species which are showing remarkable growth. An average of four feet per year in height growth is not at all uncommon.

This visit, along with the numerous inquiries received concerning Southern hardwoods, impresses us with the growing importance of the hardwood problem and the advisability of our starting investigations in this important forest type in the near future.

Protection, Fire

The summer burnings of the four station fire plots at Urania, La., McNeill, Miss., and Maydelle, Texas, were made during the month. Due to relatively high humidity and the scantiness of ground cover and litter, these fires did little damage compared to what might be expected from burning during the vegetative season. In no case was more than thirty per cent of the area burned over on any plot. This is in contrast to the summer fire of 1925 at Urania which under very dry conditions killed practically every tree on a quarter acre plot of eleven-year-old loblolly pine. The Station fire plots should ultimately bring out interesting correlations between weather conditions and fire damage.

Measurements

Forbes completed the manuscript for the Pine Growth Study.

Management

Barrett began to work up the field data for the various thinnings on the plots at Urania which were made at the time of taking the second five-year remeasurements in 1924-1925.

Naval Stores

Wyman gave a talk during Farmers' Week at the University of Florida at Gainesville on "Managing the Naval Stores Crop on the Farm."

Recent high water at Sampson Lake has interfered considerably with the chipping tests there. Some trees could not be chipped nor the gum dipped, especially those trees being worked for the first season where the faces are made near the base of the trees and where the trees were surrounded by water.

Forestation

Wakeley and Barrett spent a few days at the Bogalusa nursery in making seedling examinations, including remeasurements, a mortality count, and weeding.

Prof. Hayes of Louisiana State University completed his field examinations of the Great Southern Lumber Company plantations and is now working up the results. He expects to bring out correlations of such factors as season of planting, site, and kind of stock (nursery vs. wild) for different aged plantations of longleaf, slash, and loblolly pines.

# # # # #

CALIFORNIA FOREST EXPERIMENT STATION

Recommendation for the location of the Station headquarters was submitted to the Secretary August 4, and we expect to move as soon as approval is received.

Mr. Clapp approved the location of two field stations - one at Feather River and the other at Devil's Canyon, in San Bernardino National Forest. The Devil's Canyon station will be handled cooperatively with the State and three southern counties, for the production of experimental nursery stock. This project will be almost entirely financed by the cooperating agencies. The selection of the personnel for southern California has not yet been made.

Dunning has been piloting Wieslander and Siggins to the permanent sample plots scattered in the Sierra Nevadas in order that they may learn of the work conducted in the past. This has been an exceptionally fine seed year and in connection with the general travel of this staff data are being collected as to the character and quantity of seed produced by various types of trees.

Kotok, in cooperation with Dr. Meinecke, advised the commander of the Presidio Military Reservation as to the handling of plantations established thirty years ago for military purposes. These plantations are chiefly Monterey cypress and have not been cared for for many years.

In view of the serious fire situation Kotok is still participating in fire work.

The station was visited by Mr. McIntyre, from District 3, who was on his way to Portland. We had an opportunity to discuss with him the slash disposal experiments being undertaken on the Fruit Growers Supply Company sale.

# # # # #

PACIFIC NORTHWEST FOREST EXPERIMENT STATION

The outstanding incident of the month was the visit of Messrs. Clapp and Marsh who were in these parts about twelve days, divided between the Experiment Station, the Office of Products and Grazing Investigations. The only Experiment Station field trip was two and a half days at Wind River, on one of which, in company with District Forester Granger and Mr. Chapline the joint study of grazing use of logged-off Douglas fir lands was well discussed and viewed on the ground. Special attention was given by Mr. Clapp on this trip to the needs and possibilities for fire studies. It is a line of research, we feel, that promises to yield large dividends, for the whole fire prevention and suppression industry - if it may be called that - is in its infancy.

Isaac was in the field on various phases of the Douglas fir reproduction study. The seed dissemination phase was enlarged by the construction of thirty new seed catchers that were placed at regular intervals out from a body of green timber at Wilark, Oregon. The most distant catcher is one-half mile out and only two trees had to be felled to completely clear this great area of logged-off land. The twenty seed catchers that were in operation at Scappoose last year were re-conditioned and set out for this year's catch. Some time was spent with Dr. Kienholz working out the details and selecting the areas for the intensive study of Douglas fir that will be made next year.

Isaac and Kienholz reexamined the reproduction plots which are scattered over a number of logged-off areas in western Oregon and Washington. There are some 256 such plots under observation. The August examination showed practically no new germination, but a heavy mortality in the one-year olds, especially in hemlock. With Kienholz, Munger spent a week going over the series of plots on the gravel soils of the Puget Sound Region. Dr. Kienholz terminated his summer work at the end of the month and returned to his teaching duties at the University of Illinois. He expects to do some laboratory research with Douglas fir seed, soils and seedlings during the winter.

Westveld, with his assistant Harold Sayre, spent the month in eastern Oregon on the brush disposal study. Fifteen temporary sample plots were examined. A. C. McIntyre of District 3 visited Westveld to see brush disposal practices here and to discuss on the ground the work being done here so that methods in the two regions may be correlated.

A general rain August 17, the first for most of the region in two months, put the quietus on forest fires for the present. Up to that time both McArdle and Simson had been visiting many going fires. The latter was in on the Twin Buttes fire, Columbia Forest, in heavily mossed silver fir, which burned quickly and clean.

McArdle returned to Portland for conferences with Prof. Jonson and Messrs. Clapp and Marsh. He visited a number of fires on privately owned lands to observe the suppression methods in vogue among the State firewardens. A ten-day trip was made through eastern Oregon with E. H. MacDaniels, in charge of cooperative work under the Clarke-McNary Act for this district. This trip afforded numerous opportunities to talk over fire suppression and protection problems with State firewardens and local Forest officers. McArdle also spent two days while in eastern Oregon visiting the yellow pine brush disposal study of Westveld. On the 29th he went to the Wind River Branch to help with some of the studies being conducted there.

Collecting enough seed for our experimental work next year is taking considerable time of the men at Wind River, because the crop is very short and we come in for our share only after the worms and squirrels.

Meyer, with James Robertson, have been working empirical stands of Douglas fir in various parts of Oregon all the month and building up a mass of data from which to study the effects of understocking on yield.

Miss Wertz is taking a two weeks vacation in Colorado. Meanwhile, Miss Marthaller, who has been assisting in the District Office all summer, returned to her regular place with us.

Munger delivered a 7-minute radio talk under the auspices of the Western Forestry and Conservation Association August 24th on "Forestry and the Farmer."

As an evidence that the stronger companies are coming to the practice of forestry - and are proud of it - the Long-Bell Lumber Company has just issued a little illustrated booklet, which is being widely distributed, entitled "Long-Bell Practices Forestry."

There have been many callers both at the office and at Wind River during the month. Among the outsiders were Dr. Stepan Soudek of the College of Agriculture and Forestry of Czechoslovakia, Prof. Hawley of Yale, Mr. Shirley Allen, and Mr. Baxter of the University of Michigan Forest School.

# # # # #

Fire fighting was the all-compelling work of the Forest Service in District 1 during July and August, and the Experiment Station was drawn into it along with every other branch of work. By late July the fire situation had developed into a very grave emergency. The lightning storms of July 6 and 13 had set an unprecedented number of fires. There were more fires than the smokechaser organization could handle and, in addition, the heavy pall of smoke made it impossible to detect many of them until they were large. Continued high temperatures and low humidities, and, worst of all, uninterrupted high winds day and night from July 13 to 19 and at intervals thereafter, prevented holding such fire lines as could be built. After August 10 the condition with regard to winds improved somewhat and progress in trenching was possible. Precipitation was practically nil for nine weeks. The rain gauge at the Experiment Station recorded only 0.16 of an inch of rainfall between June 20 and August 16. Under these conditions fires became large in spite of the efforts of an army of nearly 3,000 fire fighters. The total area burned to date is estimated at 330,000 acres and the suppression costs are close to 1¼ million dollars.

With such an emergency as this, it was necessary to mobilize men very much as in war time. All available overhead for fires was drawn from the comparatively safe eastern Montana Forests, including Supervisors, Assistant Supervisors, and Rangers. Then overhead to the extent of some 30 men was called for from Districts 2 and 4. Along with the other units the Experiment Station staff was heavily drawn upon, including Weidman, Kempff, Gisborne, and Field Assistants Correll and Huntington. Altogether the Station put in five man months in fire fighting during July and August. A good rain fell between August 16 and 18 and shortly thereafter most of the outside overhead was released, including the Experiment Station men.

Kempff, Gisborne, and the two field assistants were engaged chiefly on the Quartz Creek fire on the Kaniksu Forest. Weidman was on two medium-sized fires which were burning toward each other on the divide between the Pend Oreille and Kootenai Forests. The Quartz Creek fire is the one which burned within a mile or two of the Experiment Station. It reached an area of about 18,000 acres. This fire was completely trenched and considered under control four days before rain came. This is a record not often attained on large fires in the western white pine type.

The Quartz Creek fire offered Gisborne an excellent opportunity to carry on observations of fire behavior in relation to varying weather and fuel conditions. He made notes and took instrumental measurements on the edge of the fire, along the trench and ahead of the trench. Kind, volume, and arrangement of fuels were observed in relation to fire as it picked up, crowned, died down, and held over. In addition to his own notes, Gisborne has collected notes on fire behavior from all the camp foremen on this fire. These are to be correlated and compared with the complete meteorological records obtained at the Experiment Station. An attempt will be made to write a meteorological history of this 30-day fire with the idea of bringing out the various factors responsible for the differences in behavior.

Gisborne's experience on going fires this summer has strengthened his belief that the woody materials, such as twigs, slash, windfalls, logs, and snags, are by far the most important fuels for carrying fire as well as holding it. In view of this he feels a more exact knowledge is needed of the relations between weather and wood moisture content and between wood moisture content and wood inflammability. A large number of observations of behavior of fire according to fuel and weather conditions were obtained, which will be correlated and analyzed at the end of the field season. As may well be realized, the conditions encountered in a large going fire are so varied and the apparent contradictions sufficiently numerous that tentative conclusions are unsafe to make until all the factors are carefully analyzed.

A preliminary consideration of notes on fires made by the airplane observers indicates a possible future use of such material after a more uniform terminology is evolved for the description of fire behavior as seen from the air.

Haig, Reineke, and the two field assistants making up the party on the white pine yield study were lucky enough not to be called on for fire duty. The party was on the Coeur d'Alene Forest where there was only one large fire (35,000 acres), with no trouble elsewhere on the Forest so that outside overhead was unnecessary. The party was therefore able to make good progress during August. Thirty-two yield plots were measured. In addition, several days were spent taking volume table measurements. Reineke spent approximately five weeks working with the field crew. His detail was very much worth while. He aided considerably in the field work and through his familiarity with office conditions and methods he was able to help very materially in lining up the data for office compilation so that there will be no lost effort, particularly if the data are taken to Washington for compilation.

Wahlenberg reported interesting preliminary results on the brush competition study, which is a phase of the large field survival project. A plantation of 1800 yellow pines of 1-2 stock was made in April this year on an east slope containing a typical cover of Ceanothus velutinus. Selecting 600 bushes, well scattered over the mountain side, three trees were planted on the slope just below each bush. One was placed under the bush where it received much shade and root competition; one was placed well out from the bush where it received no root competition and very little, if any, shade; and the third was set in an intermediate position under the outer edge of the crown of the bush where it received some shade and possibly some root competition. During the summer an instrumental soil study was made involving surface temperatures, evaporation, and available soil moisture. These measurements indicated that moisture available for yellow pine became exhausted in the open a few weeks previous to the August rain which ended the prolonged period of drought, but that some available soil moisture still remained under the bushes. On August 20 a complete examination was made of the plantation and the results, which are shown in the following table, check remarkably well with the instrumental study.

	Open	Intermediate	Under Brush
	%	%	%
Thrifty	40.2	56.8	79.7
Unthrifty	12.6	10.7	9.0
Alive	52.8	67.5	88.7
Dead	47.2	32.5	11.3
Total	100.0	100.0	100.0

These results of one season's experiment show consistently and unmistakably the value of the shade of brush in aiding the establishment of planted trees. In rounded-off figures the survival was 53 per cent in the open, 68 per cent in the intermediate position, and 89 per cent under the shade of Ceanothus brush. This is but the first step in the project. The second is to determine whether the trees which have become established under the brush can later compete with the brush successfully. If planted stock can grow through brush without great hindrance, Ceanothus in this District may become an important nurse for planted trees on dry sites.

In the few days of August remaining after their release from fire duty, Kempff and Field Assistants Correll and Huntington undertook to establish reproduction plots in recent cutting near the Experiment Station. This project, which has been on the program two years, involves the establishment of small screened and unscreened quadrats with a view to determining the relative importance of reproduction from stored and disseminated seed. The project, of course, requires the quadrats to be put in in a good seed year and before the cones open and drop their seed. Last year was a fair seed year and this year a good one. But both years the Station force has been engaged in fighting forest fires until after the opening of the cones. It was particularly a disappointment that the plots could not be established this year.

Messrs. Clapp, Marsh, and Chapline were in the District the last 10 days in the month going over the work of the Experiment Station, and Products and Grazing studies. So far as the Experiment Station was concerned, the party had no time for field inspection and took up the Station program entirely in the office at Missoula.

# # # # #

ROCKY MOUNTAIN EXPERIMENT STATION

At the Fremont field station by far the most important activity of Roeser has been the annual reproduction count in the Douglas fir methods-of-cutting study. This count, following the final cutting of the shelterwood stand last winter, is to be the last one until a lapse of three years, since the rate of reproduction in the selection and shelterwood plots would seem certain to be more gradual from now on, and the slow rate of change of the clear-cut and uncut plots seems fully established. The counts this year have been the "heaviest" actually made in any of the 13 years of the study. The season has been an exceptionally favorable one for all kinds of vegetation, since early spring, and this, following a heavy seed year for Douglas fir and spruce, has caused a veritable deluge of new seedlings to appear. Pearson's study of yellow pine has shown how very good a certain rare season may be; in the Douglas fir type we should expect, and have found, some progress of reproduction nearly every year. Still, the differences between the best and poorest years are of hardly less magnitude than in the yellow pine type.

Bates made a very profitable trip to the Cochetopa and Rio Grande Forests from the 4th to 13th of August, inclusive. On the Cochetopa, where the special problem of lodgepole is so local that a branch research station does not appear justified, plans were laid and preliminary work done on the ground toward a local study of various aspects of growth in the lodgepole type, which should keep Junior Forester Johnson busy for at least three seasons. Illustrating the uncertainty of any plans made for administrative men to carry out, however, is the fact that Johnson has been on D-1 fires ever since the plans were discussed on the ground, and any accomplishment this year is hardly to be expected.

On the Rio Grande, cutting plots in Engelmann spruce, dating back to 1911 and 1913 were brought up to present D-2 research standards by the tagging and recalipering of the trees. With the same thing being done on the Uncompahgre by the local force, there are now no plots considered useful to Research which are not in excellent shape for continuous and most precise future record.

During the latter part of the month Bates has completed a report on the Rio Grande plots, the written plan for the Cochetopa investigations, and the joint report with Roeser on the Nebraska source-of-seed inquiry. This last has been placed in the District Forester's hands as early as every phase could be completed, so that the special collections which seem so urgently needed can be begun this fall, if the plan is approved by him. Execution of the plan must be left largely to local officers, with Research aiding progress whenever it can. The Station feels a good deal of pride in this report; it is a clear example of what breeding methods may be expected to do for planting, and it is confidently believed will lead to a living demonstration of the value of careful seed selection, in a few years. The report may contain some possibilities for publication.

Between other duties Bates has continued preparations for the installation of the comprehensive nutrition tests to be started in cooperation with the Colorado Agricultural College, including the writing of a detailed working plan of 32 pages. The problem causing the most concern is the selection of the most suitable sand, which can be obtained at reasonable cost, to carry the nutrient solutions.

In September it is hoped to bring the materials together for these nutrition tests. Ten to fifteen days will be required alone for the preparation and chemical cleaning of the sand. The first few days of the month will be spent on closing out the artificial lighting test which has run since last November. Thereafter, Bates expects to go to Wagon Wheel Gap for a few days to make final preparations for the closing out of that project, and to meet Mr. Clapp for the annual going-over of plans.

# # # # #

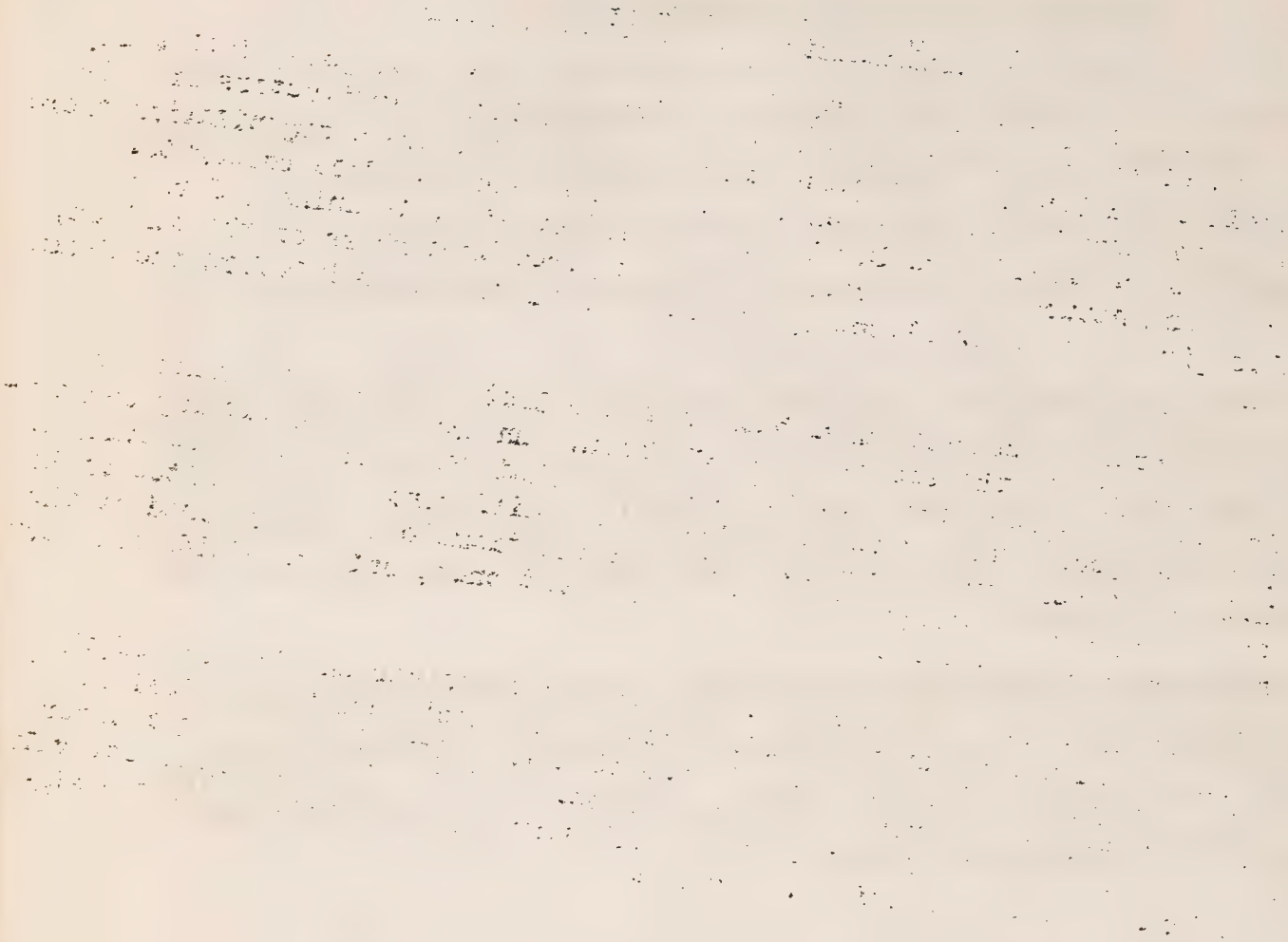
SOUTHWESTERN FOREST EXPERIMENT STATION

The Ranger Training Camp began August 16 and was going full swing at the close of the month: some forty men, including instructors are attending. Although the training camp is under a separate organization there are many ways in which the experiment station can and does cooperate. Lectures and field work in planting, yield studies, thinnings, forest types and natural reproduction have been given by members of the station, this giving us an excellent opportunity to place our work before the field men.

Krauch and Wales have been busy the last week in collecting growth data for use in the Coconino Working Plan. An interesting finding confirming that of other work here and abroad is that diameter growth is fully as rapid on poor sites as on good sites. The difference between sites is in height and density of stands. Merchantable diameters are attained at the same age on the poorest sites as on the best ones, but the yields are very much lower on the former.

Cooperrider and Pearson recently made another examination of the smelter smoke area in the Verde Valley. The most encouraging feature of the situation is that it appears possible to maintain a good soil cover even on the most severely affected areas. Since by far the greatest value of the area, aside from the copper industry, is as a watershed, the significance of this finding is evident.

# # # # #



MANUSCRIPTS RECEIVED

Pacific Northwest

"Artificial Tests of Douglas Fir Seed Dissemination," by Leo A. Isaac (File Report).

"Douglas Fir Seed Storage in the Duff," by Leo A. Isaac. (Progress Report No. 1).

Rocky Mountain

"Seed Selection for Nebraska Planting," by C. G. Bates and J. Roeser, Jr. (File Report).

Washington

"Timber Growing and Logging Practice in the Southwest." R. E. Marsh. (For Review).

Appalachian

Biltmore Plantations. F. W. Haasis. (To Editor).

In Print

Gisborne, H. T. "The Trend of Forest Fire Research in Northern Idaho" (Idaho Forester, 1926).

Gisborne, H. T. "Meteorology and Forest Fire Protection." (Forestry Kaimin, 1926).

Haasis, F. W. "Exposure Factors for Forest Photography." (American Photography, August, 1926).

Hanzlik, E. J. "Trees; A Study for Lumbermen." Western Yellow Pine (Four L Lumber News, July, 1926).

Korstian, C. F. "Factors Controlling Germination and Early Survival in the Oaks" (Yale Forest School News, July, 1926).

Wahlenberg, W. G. "Western Larch Nursery Practice." (J.A.R., August, 1926).

# # # # #

FOREST PRODUCTS

District 1

Wood Preservation

The treatment of the timber for the cooperative fence post project at the U. S. Livestock Range Experiment Station, Miles City, Montana, was completed during the month. Five species, a total of over 1,100 fence posts, and four distinct treatments are included in this project. In addition to the service test records that will be obtainable, a great deal of information was secured as to length of treatments necessary, penetration, absorption, etc. The following tabulation will be of interest:

Species	Steeping Process: Zinc Chloride	Steeping Process: Sodium Fluoride	Open Tank: Creosote-Petroleum Mixture	Dry Arsenic Powder Treatment	Untreated
Lodgepole Pine	110	66	25	17	20
W. Yellow Pine-round	80	85	--	35	23
W. Yellow Pine-split	20	20	--	6	8
Cottonwood	40	40	26	24	16
Ash	20	20	--	13	8
Cedar-split	50	50	41	209	50
Total posts	320	281	92	304	125

Little Used Species Project

The report on western larch has been prepared in the form of a memorandum for the files. This brings together all the available data on the problem. Its purpose is twofold: to provide the Laboratory with everything which may be of value in the preparation of the "Properties and Uses" bulletin for western larch and to afford a basis for the future work which the District must carry on with the producers.

Lumber Prices and Movement

	Annual 1925	First Q. 1926	Second Q. 1926	July 1926
Idaho White Pine	$37.37	$37.10	$38.65	$38.95
Western Yellow Pine	28.02	29.33	28.14	25.03
Larch-Fir	19.33	19.33	18.05	17.81
White Fir	20.14	19.79	19.86	18.98
Spruce	24.28	23.60	25.68	23.32

	July, 1925	July, 1926
Cut	187,737 M	178,816 M
Shipments	162,120 M	175,484 M

FOREST PRODUCTS

District 5

Laboratory Cooperation

During the first half of the month, Mr. Brundage accompanied E. M. Davis of the Forest Products Laboratory on a field trip to some seven or eight large mills of this District and assisted in his studies of manufacturing practice with special reference to thickness of 1 inch lumber. A large number of green and dry wood samples were secured and forwarded to the Laboratory.

White Fir Study

The trip with Mr. Davis was also used for gathering material on the white fir study. Wide variations were found in the practice in handling white fir in different parts of the State. In the redwood region all the fir lumber found proved to be Abies grandis rather than Abies concolor. We had previously known that white fir in Humboldt County was largely A. grandis, but the exclusive occurrence of that species as far south as Mendocino County was not entirely expected. White fir, however, forms less than 5% of the production of the redwood mills and the operators have very little interest in spending any money to improve the product or boost the selling price. They believe, although without any real supporting data, that the quicker white fir can be sent on its way to the market the more they will make, or at least the less they will lose. It is therefore marketed green as fast as they can take it off the saws. One redwood mill was found which claimed a small profit on white fir or at least an even break, although the price received for white fir from the redwood region is no greater than that received for the material from the much larger and more defective A. concolor timber in the rougher logging country in the Sierra.

Mr. Hill also secured some very interesting and instructive information on the commercial aspects of white fir marketing in the San Joaquin Valley. This will be incorporated with Mr. Brundage's information in a progress memorandum for the Districts and the Forest Products Laboratory.

Waste Utilization

In a trip to Los Angeles, Mr. Hill paid an incidental visit to the Scott Union Sawdust & Shavings Company, which had had recent correspondence with the laboratory with regard to possible market outlets for such waste. He obtained some exceedingly interesting information. The annual output of this company is about 10,000 tons, which is approximately half that of the Los Angeles District which is marketed. On the other hand, the total amount marketed is but a small fraction of the production, the balance being used chiefly for fuel at the producing plants. The output of the Scott Union Company is distributed as follows:

Wall board and plaster board	50%
Meat markets, packing, etc.	15%
Filler for hollow tile and gypsum blocks	12%
Meat smoking (hardwood sawdust)	5%
Sweeping compound	5%
Stock bedding, nursery packing, etc.	4%
Cement curing	3%
Cyanide manufacture	3%
Woodstone and composition sinks	2%
Roofing paper	1%

Small amounts are shipped to Nevada for ice packing and some to a powder mill in Arizona. For the wall board and plaster board used, the sawdust is screened through a 1/6 inch mesh. For other uses it is finer but only three grades of screen are used at that plant, namely, 1/6, 1/12 and 1/18.

Lumber Census

The exasperating remnant of the delinquencies was cleaned up during the month and all schedules forwarded to Washington. A summary for immediate use subject to correction by the final approved figures of the Census Bureau was also prepared. The total cut of California for 1925 was 2,043,435 M feet of which 1,438,400 M were cut in the pine region and 605,035 M in the redwood region. This total production is just about half way between the totals for 1923 and 1924. The largest cut by species was western yellow pine, with a total of 785,016 M, followed by redwood with 490,561 M.

Grape Packing Sawdust

Both redwood and Douglas fir sawdust, which are the two species now chiefly used in grape packing, are objected to on account of a slight taint imparted to the grapes. During the month a cooperation was arranged between investigators in the grape industry and the Sugar Pine Lumber Company at Fresno for the production of an experimental quantity of white fir sawdust, properly screened for grape packing purposes, and a test will be made by packing several kegs of grapes in sawdust of each one of the three species. These will be left a year in storage and then tested for results.

Pulp and Paper

From the Pacific Lumber Company at Scotia, California, have been obtained some small samples of the pulp and semi-manufactured fiber for rayon manufacture which that company is now producing from redwood bark under patents recently taken out. The material looks extraordinarily promising and they claim that it has been pronounced on test superior to the high grade sulphite pulps ordinarily used for rayon, despite the fact that past experience, both experimental and practical, has not indicated a high value for the wood of redwood, to say nothing of the bark, even for craft pulp and paper manufacture. The samples of pulp and semi-manufactured fiber received are bleached to a perfect whiteness.

Economic Research Council

Mr. Hill's committee on natural resources held a meeting on August 26 at which recommendations for Council action were presented covering projects in the measurement of current forest resources, the publication of a soil and forest map of the State and of a handbook on California climate, and investigative projects in connection with stream gauging, snowfall survey and other factors contributing to the determination of the annual water crop of the State.

# # # # #

FOREST PRODUCTS

District 6

General Survey of Woods Waste in the Douglas Fir Region

A large percentage of the logging camps in the Douglas fir region suspended operations the last of June and have remained closed during July and August. This shut-down was caused partly by a saturated log market and partly because of the dangerously dry conditions in the woods. Most of the companies are to begin logging again on the first of September.

The woods survey of the northwestern end of the Olympic Peninsula has been completed. The companies studied in this locality are leaving more material on the ground than has been found at any camp so far studied. This condition, it is believed, is in part due to the long distance to market which involves towing the logs more than 100 miles through salt water.

The Merrill and Ring Lumber Company, an independent logger, has recently installed a small, circular sawmill at its booming and rafting site for the purpose of salvaging some of its cull logs and sinkers. This mill, which has a capacity of 40,000 B. F. per day, but which on cull logs has only averaged 15,000 B.F. per day, is used to cut out railroad ties and bridge timbers. In this way the company manufactures all of its own railroad and construction timbers and supplies some material of this character to neighboring operators. The cut of the mill is very small, but is helping to utilize some timber that would otherwise be a dead loss.

The Bloedel-Donovan Lumber Mills Company's logging operation was also studied. This company is a logger manufacturer and is logging under practically the same conditions as is the Merrill and Ring Lumber Company. It is believed the study of these two operations will result in some very interesting comparisons between the independent logger and the manufacturing logger.

In an interview with Mr. Mark Reed, president of the Simpson Logging Company, data were secured for an article on the integration of wood-using industries. The Simpson Logging Company is developing an integration of wood-using industries at Shelton, Washington, toward closer utilization in the woods. Reference was made in last month's report to the fact that a pulp and paper company is to be installed at Shelton, which means that a pulp plant will be near the company's timber holdings. Waste from both the mill and logging plant will be utilized at the pulp plant.

In connection with the survey, as a side line, information is being collected as to the period of years which the various companies have before them until their present virgin timber holdings are completely logged off. It is being found, according to the statements of the companies

themselves, that a surprisingly large number of operators will be completely cut out within a period of from 5 to 10 years. A very small percentage of companies have more than ten years cut ahead of them.

Region Acquainted with the Plans of the Service Regarding Utilization Studies

An article, "Utilization Studies in the Douglas Fir Region," by Mr. Gibbons, appeared in The Timberman and West Coast Lumberman. Formal announcement of the general woods waste survey in the Douglas fir region was held up pending the time when the survey would be well under way, not only regarding individual studies made but cooperation arranged for. Special effort has been made to get to the industry the thought that the Service is approaching this job solely in the spirit of helpfulness, and in no sense for the purpose of collecting information that might serve as a basis for condemning the industry in the matter of wood waste.

Seed Trees Survive High-Lead Yarding

Mr. Koroleff, who is assisting with the general woods waste survey in the Douglas fir region calls attention to the following information: "Many believe that high-lead yarding is incompatible with leaving seed trees. In "Timber Growing and Logging in California" (Department Bulletin No. 1402) it is stated that in a typical case of yarding by high-lead method in pine forests of California, 77 per cent of standing trees over 12 inches in diameter were destroyed.

"High-lead yarding, due to inherent features, is probably more destructive to prospective seed trees than any other method of power logging. However, in spite of this, the leaving of seed trees is feasible even with high-lead yarding, provided the management and logging crew earnestly try to save them, and such trees are not located in the immediate proximity of spar trees or yarding roads.

"A record of interest in this connection is found on the timber sale in the Olympic National Forest where the Polson Logging Company is operating in Douglas fir and 'fog belt' forest types. The company is yarding by a typical high-lead and 'swinging' the logs to the railroad by a North Bend sky line.

"Forest Ranger Eckerson marked on this sale about 130 trees, distributed over approximately 220 acres, to be left as seed trees. The trees were 2 feet in diameter and upward, and were selected, at the time of felling timber, with due consideration to their position in regard to prospective spar trees. The logging crew was instructed, through the camp foreman, to avoid damaging the seed trees. Practically none of the marked seed trees were thrown down or broken in falling the timber or in high-lead yarding. The number of seed trees injured in logging, beyond recovery, was so small that the loss of seed trees due to logging was only 3 to 5 per cent of the total. The company states that the special efforts required to save the seed trees were so small that the expense connected with them may be completely disregarded."

Pacific Northwest Woods for Box Tests

During the month there were shipped to the Laboratory 632 board feet of 2x12"-16' western yellow pine and 640 board feet of 2x12"-16' silver fir (Abies amabilis) for use in box tests. The pine was supplied gratis by the Baker White Pine Lumber Company, Baker, Oregon, and the silver fir by the St. Paul and Tacoma Lumber Company of Tacoma, Washington. In each case the material was specially sawn, also cut from a number of logs so as to be representative of the species.

Six large and two small companies in eastern Oregon were visited in an endeavor to secure a supply of lowland white fir (Abies grandis). In this connection it was learned that practically none of this species is now sawn owing to the low grade of the material produced and the large amount of defect occurring in the timber. All operators were of the opinion that in order to get the material desired the trees would have to be selected in the woods, felled and hauled to the mill for this special purpose.

Cooperation, Bureau of the Census

Considerable field and office work was devoted to securing additional data and rounding up delinquent companies in connection with the lumber census for 1925. In this connection it was forcibly brought out that many of the mills, both large and small, do not segregate their sawmill and planing mill accounts. The records are combined to an extent that it is very difficult to obtain detailed data for the two operations.

Sawing Practice (as to size), Shrinkage, etc.

Toward the close of the month Mr. E. M. Davis of the Laboratory came to the District to pursue the nation-wide study of sawing practice. Mr. Davis will spend five or six weeks in the Douglas fir region, during which time Messrs. Gibbons and Johnson while pursuing other work will assist Mr. Davis.

# # # # #

FOREST TAXATION INQUIRY

During August, H. H. Chapman, R. C. Hall, and Paul Herbert, with the assistance of L. S. Murphy of the Washington office, began the study of tax conditions in St. Louis County, by a study of the county records at Duluth, which are exceptionally complete. This was followed by a detailed study of seven selected townships. All available data on assessments, sales and physical survey were first assembled and a field examination was then made of each town.

Miss. Jennie Goddard continued the study of State finances at St. Paul. Dr. Fairchild spent the month in the East on vacation.

# # # # #

Washington

As no details respecting Mr. Chapline's field itinerary were given in the last report, it might be well to state that after leaving Washington July 10 he spent approximately one week in the District Office at Denver considering the Grazing Research work, as well as conferring with representatives of the District Office and Mr. Hill on the technical administrative grazing work.

The period from July 23 until August 5 was spent with D. C. Ingram inspecting the field work of the grazing management of cut-over lands projects on the Columbia and Wenatchee Forests of Washington. He also attended the conferences which Messrs. Clapp and Marsh had with Director Munger of the Pacific Northwest Forest Experiment Station and with District Forester Granger and his assistants.

Mr. Chapline Visits University of Washington

Mr. Dayton said Mr. Chapline had written that on August 5 he stopped over in Seattle for a conference with Dean Winkenwerder of the College of Forestry at the University of Washington, about forestry courses and the development of grazing men. The University has a special course for students which enables them to read up on grazing subjects, under the direction of a member of the faculty; but men desiring to specialize in grazing have been referred either to Washington State College or to the University of Idaho. Dean Winkenwerder seemed to be receptive to Mr. Chapline's suggestions and thinks he can give his men a full forestry training but allow those interested in grazing to substitute grazing subjects for some of their courses. If this plan is adopted, Dean Winkenwerder probably would like to have some of the special grazing men of the Service give a series of lectures occasionally, as is done elsewhere. Mr. Chapline was very much impressed with the facilities for forestry work at the University of Washington.

The period from August 13 to 19 was spent in inspection of field work which W. G. McGinnies is conducting relative to the study of range management on the Madison National Forest in Montana. During the balance of the month Mr. Chapline joined in the conferences which Messrs. Clapp and Marsh had with District Forester Morrell and his assistants, and with Director Weidman and his assistants on the forest research work being done in the Northern Rocky Mountain region.

Forage conditions of the Pacific Northwest are unusually dry this year and there will undoubtedly be considerable shortage of feed on many ranges this fall. This will probably result in light weight lambs being sent to market, and the early grazing of fall pastures may result in some shortage of winter feed.

The ranges of western Montana and north Idaho have also been rather short this year, but in central and eastern Montana forage conditions have been approximately average.

National Livestock Exhibit Discussed

On August 9 Mr. Dayton attended, as Mr. Chapline's proxy, a meeting of the Department Exhibit Committee in Dr. Warburton's office, to discuss the proposed exhibit at the National Livestock Exposition in Chicago. The committee seemed to favor Mr. Sheet's suggestion that the Department's exhibit be centered around the subject of meat - beef, pork and mutton - correlating the kinds of stock and feed with size and type of carcass and resultant cuts of meat; also that something of the Wool Story be shown.

Personnel

We are glad to note that Mr. Tidestrom has recovered from his recent illness and is now at his desk again. He has largely set aside his manuscript of the Arizona Flora for the time being, and states that he has a large number of Forest Service range plant packages to send back. Our Washington office force is decimated (if the phrase is admissible when the total is considerably less than ten) by annual leave.

Plant Identification

Eleven small plant collections, representing 177 specimens, were forwarded to the Bureau of Plant Industry during the month for determination. Four collections were reported on to the field during the month.

Through the courtesy of the District Forester at San Francisco and of the Supervisor of the Mono Forest, there has been deposited in the National Herbarium the type specimen of Lupinus crassulus Greene, otherwise unknown to science. This lupine was collected about 13 years ago by Assistant District Forester Hatton and Supervisor Maule on the Mono National Forest. All "types" of new species in the Washington office range plant herbarium have regularly been deposited in the U. S. National Herbarium, thus conforming with the general policy that Federal "types" of new animals and plants should be deposited in the custody of the National Museum in Washington. The Forest Service, by retaining tree "types" in the Atlantic Building, is one of the few outstanding exceptions to this general practice. If there be any other "types" of new plants in the range plant herbaria of the Service, it is strongly recommended that such specimens be forwarded to Washington for mounting on National Museum sheets and for subsequent deposit in the National Herbarium type collection.

Jornada Range Reserve

Range Conditions

Forage growth during the month has slackened to some extent due to lack of moisture but on the whole has been very satisfactory. Perennial grasses have made excellent growth and for the most part are headed out and maturing well. Annual grasses and summer weeds have not made the growth that was expected, which is due to light precipitation this month. The growing season this year has been unusually early owing to the heavy rains during June and July and as a result the vegetation is much farther advanced at this time than is usually the case. Precipitation this month has been very light except in the mountain portion of the Reservation, where several heavy thunder showers have occurred which have done considerable damage to the roads and fences. An automobile belonging to a party of geologists in the employ of the Marland Oil Co., which was left alone temporarily in a small canyon near Goldenberg, was carried away by a wall of water over seven feet high and badly wrecked by a cloudburst on August seventh.

Range Improvements

A second storage tank for stock water purposes was completed at South Well on August 8th. This tank has a capacity of 60,000 gallons and supplies three circular troughs having a capacity of approximately 4,000 gallons and located in three separate pastures. Both the tank and troughs are of sheet steel construction with concrete bottoms.

Work on the rebuilding of the mountain pasture fence which has been in bad shape for several years was begun on August 16. As soon as this fence is completed a General Round-up will be held and all stray stock removed from this pasture.

Station Improvements

All hands at the Station have been largely occupied during the latter part of July and the first three weeks in August on improvement and maintenance work at the Reserve Headquarters, which has long been in arrears. Among the things accomplished in this connection are the following: The Government Office Building was thoroughly overhauled including re-roofing, plastering both inside and out, kalsomining and painting. The dwelling house was reconditioned inside including kalsomining and painting, the old sleeping porch enclosed with glass and a new sleeping porch added. In addition to this a much needed garage was constructed.

Visitors

Professor Potter of the Oregon Agricultural College visited the Reserve on August 20, accompanied by Mr. Elser, Director of Extension for the State of New Mexico and Professor Anderson of the New Mexico State

College. Professor Potter was on his way home from the Annual Livestock Field Day held by the Texas Agricultural Experiment Station at Sonora, Texas. He is much interested and well informed on livestock investigations and spent considerable time at the Jornada Headquarters discussing range and livestock problems and making inquiry concerning conditions and projects peculiar to the Jornada and this section of the Southwest.

Santa Rita

Visitors

Supervisor Winn and Ranger Oleson spent part of August 19th in a field trip over the Reserve together with a discussion of the various projects underway. Mr. Winn was particularly interested in securing information on our method of charting quadrats so that he might initiate a standard practice among his rangers and, to this end, both the gridiron and chartograph methods were demonstrated on a sample quadrat at the station.

On August 23rd, E. E. Anderson, Government trapper for the Biological Survey, called at the station for information relative to the wolves that have been doing so much damage during the past six months. Mr. Anderson's regular District is in the vicinity of Douglas, Arizona, and his assignment here is only temporary pending the return of Mr. Nibby who has been on the sick list for the past several weeks.

Precipitation and Growth

After getting off to a fairly good start late in July, the rains have gradually eased up with practically no rain falling during the last fifteen days of August. In response to the first rains growth started rapidly all over the Reserve and continued until about the middle of August but since that time has rapidly dried up and in many places the grasses seem to have fully cured, and as a whole the Reserve does not have more than about a 40% crop of forage for this season of the year.

The average rainfall for the entire Reserve during July was 2.59 inches with 1.59 inches in August and a total average to date of 4.18 inches. The record at Florida Station shows only 60% of the average for the past twenty-five-year period. Added to this deficiency is the fact that rains this year have been chiefly in the form of light showers which have quickly dried up and have failed to produce anywhere near the amount of growth that a few heavy rains would have resulted in.

Condition of Stock

Stock continue in excellent condition over the entire Reserve and as far as forage is concerned, should have no difficulty in weathering the Winter providing we get any spring feed at all to help them along. The water supply is lower at this time than it has been for several years with no relief in sight unless early and plentiful winter rains set in, as very few of the canyons on the Reserve have run from flood since 1923 so that the underground supply of water has been very much depleted.

Predatory Animals

Just three days after he landed on the Reserve, Mr. Anderson succeeded in trapping an unusually large wolf that measured six and a half feet from tip to tip. Just now he is on the trail of three more that have been using the Reserve as a playground for the past six months.

Clipping Study

The clipping study this year is being conducted on the same quadrats that were used in 1925 and employing the same intervals and clipping heights which are as follows:

> The A, B, C and E series are clipped two inches above the ground at weekly, biweekly, monthly and close of season periods respectively.
>
> The M, N, O and R series are clipped at one inch above the ground at weekly, biweekly, monthly and close of season periods respectively.

Due to the lateness of the summer rains limited data have been secured to date but certain indications are worthy of mention.

Up to the end of the fourth week after the rains started, growth was very good in response to light continued showers over the clipping areas. However, during the fifth week, when no rain at all fell, there was practically no growth on any of the quadrats; this very clearly shows the necessity for heavy rains rather than continued light showers. At the end of the fifth week a noticeable amount of the vegetation, on the quadrats clipped weekly at one inch, had apparently completely dried up, while on the companion quadrat, cut at two inches above the ground, the vegetation still remained green; this condition also existed on the quadrats clipped at biweekly periods although it was far less apparent.

Three years' study by Mr. McGinnies on the Madison Forest has furnished information on the proper development of vegetation which should be made before grazing commences to secure the most efficient use of the forage, the amount of utilization which may be made of the principal species without detriment, and grazing capacity as influenced by plant succession.

Proper Development of Forage Species

Proper grazing after blue bunchgrass and bluestem (the two principal species on the area studied) reached a stage marked by the appearance of flower stalks for the former species and a leaf growth of 4 to 5 inches for the latter had no deleterious effect.

Proper Degree of Utilization

The density and vigor of these species was maintained when not more than 60% of the total herbage was consumed during a short period of use after the point of range readiness as indicated above was reached. When grazing was deferred until after flowering, 80 to 85% of the herbage of such species as blue bunchgrass and bluestem could be safely removed without evidence of overgrazing. However, owing to the low palatability of many of the weeds and shrubs which make up from twenty to fifty per cent of the total vegetation, only about half of the total available herbage of all species on the area will be consumed when the more palatable grasses are properly used.

Carrying Capacity as Influenced by Plant Succession

Considerable variation is shown in the efficiency of various types of vegetation in the production of forage from the same amount of precipitation. The four following large association types show successional trend from the rabbit bush to the blue bunchgrass types, or under adverse conditions a retrogression.

1. Blue bunchgrass, sedge, weed association type.

2. Slender wheatgrass, blue bunchgrass, weed association type.

3. Porcupine grass, wheatgrass, weed association type.

4. Rabbit bush, yellowbrush, weed, grass association type.

The character and value of these types are compared in the following table:

	1	2	3	4
	Blue Bunch	Slender Wheat Grass	Porcu-pine grass	Rabbit bush
Density of vegetation	.6-.8	.4-.6	.3-.5	.2-.4
Per cent grasses	75	65	85	25
Per cent weeds	20	25	10	50
Per cent browse	5	10	5	25
Average palatability (per cent)	62	54	49	25
Approximate number of surface acres to furnish one cow month's feed	2	3	4	11

The blue bunchgrass type with the greatest density and the most palatable feed is 1½ times as efficient in production of forage as the slender wheatgrass type which has a lower density and palatability. Although the porcupine grass type has a greater percentage of grass than the blue bunchgrass type it is only half as efficient in the production of forage because of its lower density and palatability. The rabbit bush type not only has the lowest density but also the lowest palatability which makes it less than a fifth as efficient as the blue bunch grass type in the production of forage.

These different types occur naturally under different rainfall, slope, and soil conditions. Overgrazing is reflected in the deterioration of stand of the more palatable species in each of these types and thus brings about a marked extension of the less efficient types, with a consequent reduction of grazing capacity.

District 3

The time has been spent very largely in field work. Early in the month some preliminary examinations were made on the Santa Fe Forest in connection with selecting areas and material for the bunchgrass study characteristic of northern New Mexico. Cooperrider met Copple at Flagstaff on the 17th to conduct vegetative work on the old 1912 Coconino enclosures. An attempt has been made to eliminate the element of error arising from the personal factor in these valuable records. A number of individuals and methods have been involved in the quadrating through the years, as well as pantograph and gridiron work. These plots and the 14 years' record will be valuable advance data for a bunchgrass study.

Copperrider and Pearson of the Southwestern Forest Experiment Station made the midsummer examination of the smelter smoke area in the Jerome-Clarkdale district.

Tonto Basin

The following work was accomplished at Summit erosion plot:

A rain gauge was established to correlate data on erosion.

A total of 1.32 inches of rainfall was recorded from July 24 to August 7, and ocular observations show a marked change in soil removal--but actual measurements will tell the story.

Twelve additional erosion stations were set in cement and cross section measurements were recorded.

A total of 37 erosion stations are now established and measured.

Eighteen browse species were tagged and located as a check against species previously tagged under protection.

The more important oak species were collected and also some interesting soil temperatures were taken at different sites. Our soil thermometer with a maximum of 200° F. is still "holding its own."

Ranger Alexander assisted in establishing and mapping a one-meter quadrat in the check erosion plot.

Some maintenance work was done on fenced plots to protect the inside from possible intrusion of inquisitive stock.

Photographs were taken at Roosevelt Hill of some common browse in pod and of Muhlenbergia porteri, also known as hoe grass, bush grass, and black grama, which species was found in the open and where there has been protection since about 1909.

A lath frame was constructed and established in Plot No. 2 to assist in the determination of factors which influence our radical crop of annuals.

A second set of flowers on some of the browse species is making plant collection a "year-round job."

# # # # #

EDITOR

EDITORIALLY SPEAKING

The difference between a blank cartridge and a cartridge that carries lead is mainly one of purpose. One is intended to make a noise and a smoke, the other to make an impression, and probably a lasting one. One as it is put forth into a busy world may engage the interest of the passer-by for the moment; the other is built to reach out and make a definite hit wherever it is aimed.

The thought conveyed by this little parable is so obvious that even he who runs away from it may read between the lines. Literature does not have to be of any particular variety or reach any especial audience to fall into one or the other of these two classes--the blank cartridge or the loaded shell. It may be exposition or narration, argumentation or description. It may be drama, history, fiction, or scientific analysis. I ran across something the other day that illustrates this very well. It was written for newspaper writers, but it applies astonishingly well to scientific writing--at least, to the kind that aims to be more than the dead-and-dusty variety.

When James Gordon Bennet, the younger, was in command of the New York Herald, he laid down a list of "Do's and Dont's for Writing for the Herald," and this list the magazine "Editor and Publisher" has lately resurrected and republished. Most of the "dont's"are confined to the use of words, and to words that rarely if ever occur in the scientific man's vocabulary. But one list of "do's" is as admirable advice for the scientist as for the reporter. If we can substitute the word "data" for "news" and the expression "scientific writing" for "newspaper English," the fit is perfect. Here is the list of "do's," intended for writers whose business it is to get their stories across effectively and efficiently and arouse the maximum amount of interest in what they have to say:

Get the news, and all the news.

Outline your story before you begin to write.

Reporters will find it to their advantage to put down a single fact, or a group of related facts, on one sheet of paper in making notes, so that they may readily and quickly arrange their material in logical sequence.

Know the subject thoroughly and think straight.

Write as well as you talk.

Avoid long and involved sentences. Make them short and crisp.

Do not try to fire your whole battery of details in the introduction.

Do not tell a story more than once.

The introduction is to give to the reader a quick, illuminating flash and to hold his attention.

Tell the story clearly and forcibly and keep away from worn and hackneyed phrases. Be original even if you take a chance.

Don't be afraid to say the same word over again if clearness requires it. Macaulay wasn't.

Shun the monotonous repetition of words, however, and especially avoid the use of the same word in different senses in the same paragraph.

Avoid tiresome circumlocation; write with interest and enthusiasm. Do not compose a story so that the reader feels that the writer was watching himself go by. The highest art is that which conceals art.

Master general principles of composition.

Observe accurately, know the facts, think straight, write forcibly, for on these commandments rest all the rules of newspaper English.

# # # # #